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ON SOME PANURGINE AND OTHER BEES.

BY T. D. A. COCKERELL.

[The types of the new species described herein, excepting *Sphecodes knetschi*, are in the collection of the American Entomological Society.—W. J. Fox.]

(1.) **Halictus parvus** (Cress.).

Panurgus (?) *parvus* Cr., Proc. Ent. Soc. Phil., iv, 175, ♂, ♀.—Cuba.

Mr. Fox sends me an authentic specimen, a ♂. It is an *Halictus* with two submarginal cells, similar to *H. anomalus* Rob. Length about 4 mm. Tongue quite slender at end; maxillary palpi 6-jointed, joints subequal, but the two last longer than those before, third joint not shorter than second. Venation as in *Hemihalictus*, i. e., with a large stigma, and third discoidal contracted above. Head and thorax green; abdomen and legs dark brown; antennæ dark brown above, pale brown beneath; face narrowed below, with appressed white pubescence; tegulæ testaceous; stigma brown; nervures piceous; front as closely punctured as is possible; mesothorax shining. I do not refer this to *Hemihalictus*, because I am convinced that it is an offshoot from the ordinary green Halicti, and has no genetic connection with the type of *Hemihalictus*, other than through *Halictus* proper.

(2.) **Halictus texanus** (Cr.).

Sphecodes texana Cr., Tr. Am. Ent. Soc., iv, 249, ♀, ♂.—Tex. (not *H. texanus* Cr., t. c., p. 251, which is *H. ligatus* var.).

In the Mesilla Valley, New Mexico, this species is not very rare. Miss J. E. Casad took it at Mesilla on April 13th, at flowers of pear. Prof. E. O. Wooton took both sexes at Las Cruces on October 17th, at flowers of the *Senecio*, which passes for *S. douglasii* in the books, but which, according to Prof. Wooton, is really distinct.

The first recurrent nervure does not unite with the second transverso cubital, though it comes very near it. Our insect is simply an *Halictus* with a red abdomen, and should be separated from *Parasphecodes* on the same grounds that *H. parvus* is excluded from *Hemihalictus*, namely, the absence of blood-relationship except through typical *Halictus*.

Parasphecodes californica Prov., must be called *Halictus californicus* (Prov.).

(3.) **Sphecodes semicoloratus** (Ckll.).

Halictus semicoloratus Ckll., Tr. Am. Ent. Soc., xxiv, 168, ♀.—N. Mexico.

A curious little species, with a narrow abdomen like the very much larger *S. kincaidii*.

(4.) **Sphecodes knetschi** n. sp. ♀.—Length about $7\frac{1}{2}$ mm., *entirely black, except that the tibiæ are dark sepia brown, the tarsi lighter brown,—one might say dull ferruginous, and the shining hind margins of the first three abdominal segments are broadly castaneous.* Antennæ wholly dark, the flagellum with the feeblest brown tint beneath; wings smoky, the nervures and stigma fuscous; tegulæ piceous. Head transversely oval, facial quadrangle much broader than long; labial palpi with the first joint longest, the last three quite short and subequal; mandibles bifid; mesothorax tolerably shiny, with a slight median carina, and very large well-separated punctures; base and sides of metathorax irregularly reticulated with raised lines; abdomen with sparse but quite strong punctures; apex with pale brownish hair; hind spur of hind tibia minutely ciliate.

♂. Similar, except in the ordinary sexual characters. Flagellum only faintly brown beneath. Nervures and stigma piceous. Legs black; the tarsi faintly brownish. (Abdomen lost in the only ♂ before me).

Hab.—Terra Cotta, Illinois (Robert Knetsch). On flowers of goldenrod, the ♂ August 25, the ♀ September 5, 1897.

Differs from *S. smilacinæ* Rob., in the larger size, color of legs and antennæ, and punctures of abdomen.

(5.) **Callandrena** (n. g.) **manifesta** (Fox).

Panurgus manifestus Fox, Pr. Cal. Ac. Sci., Ser. 2, Vol. iv, p. 113, ♀, ♂.—L. California.

Mr. Fox sends me types of both sexes. Superficially the insect resembles *Rhophites*, but the mouth-parts are entirely different. Labial palpi (♂) formed like those of *Andrena pulchella*, but shorter, with the penultimate joint much shorter than the last, whereas in *pulchella* it is very little shorter. The maxillary palpi are also of the type of *pulchella*, but shorter, with the penultimate joint very short. The eyes in both sexes are of a lilac color, perhaps due to soaking in alcohol. Stigma small, as in *pulchella*. Abdomen very like that of *pulchella*. Face-marks of both sexes much as in ♂ *pulchella*, light yellow; clypeus with sparse small punctures in ♀, large and much closer one in ♂. Wings quite dark.

Callandrena is the extreme end of the line which diverges from typical *Andrena* in such forms as *A. pulchella*, and therefore has no particular connection with *Parandrena*, the two submarginals notwithstanding. It is readily known by the yellow face-marks in both sexes, the small stigma, the palpi as described and the venation.

(6). ***Andrena chalybea*** (Cress.).*Panurgus chalybeus* Cr., Tr. Am. Ent. Soc., vii, p. 61.—California.

Mr. Fox sends a typical specimen, and also several from Southern California. The mouth-parts are practically as in *Andrena*. Process of labrum bidentate; basal nervure straight. This is a derivation of the blue *Andrenæ*, such as *A. cærulea*.

(7). ***Parandrena regularis*** (Cress.).*Panurgus regularis* Cr., Tr. Am. Ent. Soc., vii, p. 62.—California.

Mr. Fox sends a typical example. I am not sure this might not form a distinct genus; it differs from typical *Parandrena* by the wholly dark face in the ♂, the dense abdominal hair-bands, the small stigma, the third discoidal cell with its apical angle less than a right angle, the emarginate tip of the abdomen, and the longer and more pointed maxillæ.

(8). ***Parandrena nevadensis*** (Cress.).*Panurgus nevadensis* Cr., Tr. Am. Ent. Soc., vii, 214, ♂.—Nevada.

Very close to *andrenoides* (Cr.), but differs by its smaller size, fulvous pubescence, smaller cheeks, and head not so bulging behind the tops of the eyes.

The ♀ is unknown. It will doubtless be found to have a dark face and red abdomen, like the ♀ of *andrenoides*.

(9). ***Parandrena eumارpha*** n. sp. ♂.—Length about 11½ mm.

Subg. ch.—Antennæ comparatively short; abdomen with dense hair-bands; stigma small; apical angle of third discoidal cell much less than a right angle.

Sp. ch.—Black, pubescence mostly white, but pale ochraceous on occiput and thoracic dorsum. Head ordinary; face not very broad, wholly dark, densely covered with long white hair, which extends also onto the scapes of the antennæ, but ends abruptly on the front, leaving the shining and punctured surface of the vertex entirely visible. The vertex is thinly clothed with black hairs, not readily noticed, while the occiput has abundant long pale ochraceous hair. Cheeks with white hair, quite long below. Antennæ wholly dark; maxillæ quite long, acutely pointed; maxillary palpi quite elongated; mandibles slightly ferruginous at tips; thorax clothed with long pubescence; mesothorax somewhat shiny, strongly and closely punctured with a strong median groove; scutellum very closely punctured, except the anterior border, which is nearly impunctate; enclosure of metathorax dull, minutely tessellate, not bounded by a rim; tegulæ testaceous; wings dull hyaline; subcostal nervure black, the other nervures and the stigma brown; first recurrent nervure joining second submarginal cell almost at its extreme base; second submarginal narrowed about half to marginal; legs black, thickly clothed with long white hair; claws ferruginous; abdomen rather long, strongly and closely punctured, except on the shining bases of the segments; first segment with long hair, all the segments thinly pubescent; the hind margins of all the segments with dense, narrow, continuous snow-white hair-bands; venter with little hair.

Hab.—Southern California, one sent by Mr. Fox. *P. eumarpa* is a fine species, allied to *P. rhodocera* (Ckll.), but considerably larger. These insects are at least subgenerically distinct from typical *Parandrena*.

(10.) **Andrena foxii** n. sp. ♀.—Nearly 12 mm. long, *blue-black, the pubescence entirely black or dark fuscous*. Head rather large; facial quadrangle broader than long; antennæ dark, faintly brownish at the tip; face with abundant long black hair; front striate; clypeus dull, with small close punctures, no impunctate median line; tongue broad and short; mandibles dark; *process of labrum strongly bifid*; thorax quite hairy; mesothorax dull, with strong median and parapsidal grooves, its surface microscopically tessellate and feebly punctured; base of metathorax minutely rugulose; tegulæ piceous; wings hyaline, slightly smoky; nervures and stigma piceous; stigma large; *only two submarginal cells*, second submarginal longer than the first on the cubital nervure, receiving the recurrent nervures at the end of its first and beginning of its last fourths; legs black, very hairy; abdomen shining; microscopically tessellate and sparsely punctate; the hind margins of the segments brownish; no hair-bands; apex densely clothed with sooty hair.

♂. About 10½ mm. long, similar to the ♀, but dull white hair on the cheeks, front, occiput and thoracic dorsum; basal joint of hind tarsi with a dense ochreous brush on inner side; wings somewhat clearer.

Hab.—Southern California, three sent by Mr. Fox. A very distinct species, constantly with only two submarginals. I had marked it as a new *Parandrena*, but it is strictly congeneric with *A. chalybea*, and with it forms a subgenus which must have been derived from *Andrena* s. str., independently from *Parandrena*.

(11.) **Andrena phenax** n. sp. ♀.—Length 9½ mm., black, with black pubescence; quite shiny. This looks like a small example of *A. foxii* but differs in many details, as follows:—Color black, without the blue tinge; head broader in proportion to its length; vertex and front with large punctures; clypeus with large and very close punctures; process of labrum rounded at end, not emarginate; mesothorax shining, though microscopically tessellate, with large and strong punctures; tegulæ with a testaceous area behind; wings pale fuliginous; second submarginal cell not so long as the first on the cubital nervure; recurrent nervures entering second submarginal at end of first and beginning of last fifths; pubescence of hind legs short and dense; abdomen very shiny, with very distinct and tolerably close punctures, smaller and sparser on the first segment; surface less hairy; hind margins of segments not brownish.

Hab.—Southern California, one sent by Mr. Fox. Besides having only two submarginal cells, this differs from *A. nigra* Prov., in the total absence of a smooth line down the middle of the clypeus, and the color of the tegulæ. It doubtless differs in other characters, not mentioned in Provancher's short description of *nigra*. It should not be confused with *Halictoides maurus*, which has much smaller punctures on the mesothorax, base of methorax with regular raised lines, and presents many other differences when examined carefully.

(12.) **Parandrena concinnula** n. sp. ♂.—Length 7 mm., black, with thin, long, pale gray or whitish hair. Head transversely oval; facial quadrangle broader than long; clypeus lemon-yellow, with two black spots, *no other yellow on face*; a conspicuous and long fringe of white hair below the margin of the clypeus, overlapping the mandibles; mandibles dark; flagellum, except at base; ferruginous beneath; front and vertex minutely roughened; cheeks not so large as in *P. andrenoides*; mesothorax minutely tessellate, with shallow punctures, much as in *andrenoides*; metathorax like that of *andrenoides*; tegulæ brown; wings hyaline; nervures and the large stigma ferruginous; venation as in *andrenoides*, but the second submarginal cell longer on the cubital nervure; legs and abdomen like those of *andrenoides*, but the abdomen hardly so hairy. Apex of abdomen truncate, and penultimate ventral segment produced into a blunt spine on each side, as in *andrenoides*.

Hab.—Southern California, one sent by Mr. Fox. Close to *andrenoides* and *nevadensis*; easily known by the yellow of the face being confined to the clypeus.

(13.) **Parandrena enocki** n. sp. ♂.—Length about 8 mm., black, with long white hair; face wholly black.

Subg. ch.—Antennæ fairly long; abdomen without hair-bands; stigma large; *second submarginal cell longer than first on cubital nervure*; apical angle of third discoidal cell a right angle; apex of abdomen truncate; *no subapical lateral spines*. The two characters italicised differ from *Parandrena*, s. str.

Sp. ch.—Head transversely oval; mandibles slender, dark, notched within, becoming ferruginous at tips; process of labrum inclined to be bifid; flagellum faintly brownish beneath; face covered with long silky white hair, *except at the extreme sides, where it is black*; cheeks and occiput with white hair, except behind the tops of the eyes, where it is black; front and vertex coarsely rugulose, the vertex with distinct grooves; clypeus roughened, with no median smooth line; thorax small, not so broad as head; *mesothorax dull, minutely roughened, with numerous obscure but large shallow punctures*; *base of metathorax irregularly reticulated with raised lines*; pubescence of thorax long and thin; tegulæ dark brown, with shallow punctures; wings perfectly clear; nervures and stigma dark brown; second submarginal cell very long, receiving the recurrent nervures at about the end of its first and beginning of its last fifths. Legs slender, brown-black, with pallid hair; abdomen oval, shining; punctures small, feeble and sparse; no hair bands, scattered white hairs becoming dense at the apex.

Hab.—Southern California, one sent by Mr. Fox. I think this is a derivative of *Andrena* independently from *Parandrena*, but it has the general build and appearance of the latter genus. It is named after Mr. Enoch, whose admirable preparations of the mouth-pieces of bees, figured by Mr. E. Saunders, are of constant assistance to the apidologist.

(14.) **Halictoides saundersi** n. sp. ♀.—Length 7 mm., black, with not very abundant pubescence, pale greyish ochreous above, sordid white below. Head seen from in front nearly round, about as broad as thorax; antennæ short and stout, truncate at end; flagellum, except at base, dull ferruginous beneath;

scape with long hair; clypeus with large punctures: front and vertex shining, with strong well-separated punctures; labrum flat and shining; mandibles ferruginous at tips; tongue narrow and extended, but neither the maxillæ nor the palpi very long, the palpi especially are not nearly as long as in *H. marginatus*; mesothorax pubescent, but the surface visible, shining, with strong well-separated punctures; base of metathorax semilunar, with a distinct margin, shining, with many distinct and even raised longitudinal lines; tegulæ dark brown; wings dusky hyaline; nervures and stigma brown; venation as in *marginatus*, with a fairly large stigma and wavy cubital nervure; legs black, with pubescence, which shines silvery in certain lights; abdomen fairly broad, punctured, the punctures much closest at the bases of the segments; no hair-bands, but the first four segments with very broad and conspicuous testaceous hind-margins; apex with a triangular patch of velvet of the brightest apricot color. Venter flat, little hairy.

♂. About the same length, abdomen narrower. Pubescence all white; clypeus with a dense white beard; antennæ short for a ♂; middle of front with an impunctate area, surrounded by very sparse punctures; testaceous margins of abdominal segments not so broad; no apical color at the apex; first ventral segment submarginate; penultimate ventral segment with a ferruginous process, shaped something like the tail of a fish, and to each side of it a piceous process.

Hab.—Southern California, 1 ♀, 2 ♂, sent by Mr. Fox. Differs at once from *H. marginatus* by the smaller size, base of metathorax, color of apex of abdomen, etc. Named after Mr. E. Saunders, who has given excellent descriptions and figures of the structural characters of many genera of bees.

(15.) ***Halictoides mulleri*** n. sp. ♀.—Length $7\frac{1}{2}$ mm., black, the front and vertex having a strong blue tinge; pubescence scanty, except on hind legs and parts of the abdomen, white, more or less tinged with ochreous; some inconspicuous black or fuscous hairs on scape and vertex; occiput with quite a conspicuous white fringe; sides of face with white hair; head somewhat broader than round, viewed from in front; front and vertex strongly and very closely punctured; clypeus with large punctures, absent just before the anterior margin; mandibles short and stout; tongue long and narrow; palpi not very long; antennæ very short, truncate at tip; flagellum dull ferruginous beneath; mesothorax bare, shining, with very close, strong punctures; area round tegulæ pubescent; metathorax with the enclosure not well defined, presenting rather obscure longitudinal raised lines at the base; tegulæ dark brown; wings smoky hyaline; nervures and stigma dark brown; venation like that of *marginatus*, except that the first recurrent nervure enters the second submarginal cell very near its base; legs black; pubescence on hind tibiæ and tarsi dense; abdomen closely punctured at the bases of the segments; hind margins of the first three segments brownish, of the fourth whitish; bases of second to fourth segments banded with appressed white pubescence; third segment with a subapical white hair-band, thin or interrupted in the middle; fourth with an apical band; apex fulvous, surrounded by dark fuscous hairs; fourth ventral segment with a transverse median depression.

Hab.—Southern California, sent by Mr. Fox. Differs from *marginatus* by the bluish tint of head, banded abdomen, smoky

wings, etc. The name is intended to recall Dr. Hermann Müller, and his admirable researches on the relations between bees and flowers.

(16). **Halictoides maurus** (Cress.).

Panurgus maurus Cr., Tr. Am. Ent. Soc., vii, p. 61, ♀.—Colorado.

I have an authentic specimen sent by Mr. Fox. The species is allied to *H. campanulæ* Ckll., but differs by the color of the pubescence. Apical angle of third discoidal cell a right angle; venter of abdomen with a subapical projection and tuft of hair; head transversely oval, with small eyes; facial quadrangle much broader than long; clypeus densely punctured.

(17). **Halictoides virgatus** n. sp. ♀.—Length about 9 mm., black.

Allied in structure and appearance to *H. mulleri*, but differs in its larger size, the head black, without a blue tinge, head not broader than long; semilunar base of metathorax distinctly defined, with distinct but very fine raised longitudinal lines; abdomen with the hair-bands rather better developed; apex of abdomen surrounded with pale fulvous hair.

♂. Length 10 mm., black, hoary, with white pubescence; some black hair at top of scape, at sides of face below antennæ, on upper part of cheeks, on extreme sides of vertex and on front below ocelli, nowhere very conspicuous; head nearly round, seen from in front; the vertex somewhat elongated; occiput with a conspicuous fringe of hair; scape with long hair; clypeus with a dense white beard; front and vertex, strongly and closely punctured; palpi tolerably elongated; antennæ moderately long, black, submoniliform, first four flagellar joints about equal; thorax tolerably hairy, the hairs sordid white; mesothorax shining, strongly and closely punctured; base of metathorax depressed, with numerous, very fine, raised, longitudinal lines; tegulæ brown; wings dull hyaline; nervures and stigma brown; venation as in *halictulus* (*♂ marginatus*), except that the second submarginal cell is more narrowed above; cubital nervure bent; legs black or dark brown; hind tibiæ swollen, with much silvery white hair; on the inner side of the hind tibiæ near the base is a very long curved tuft of white hair; middle femur produced beneath into a prominent lamina shaped like the keel of a racing yacht; basal joint of middle tarsus with a large semilunar lamina on the inner side; basal joint of hind tarsus long, produced at end into a sharp beak-like process, second and third joints of hind tarsus small, with a long lateral process; abdomen well punctured; hind margins of segments whitish; white hair-bands at margins of segments distinct (sometimes largely abraded); apex with silvery hair; first ventral segment submarginate at tip; fourth ventral segment with a projecting point at each extreme side posteriorly; a subapical tuft of white hair, before which is a longitudinal ochreous band.

Hab.—Southern California, 4 ♀, 3 ♂, sent by Mr. Fox. The ♂ is easily known by the extraordinary legs, as described. In the ♂ of the allied *H. saundersi* the legs are slightly modified in the same direction, the front and middle femora being keeled

beneath, but the edge of the keel uniformly curved, the hind tibiæ somewhat swollen, and the second and third joints of the hind tarsi produced at the side. The middle tibiæ of *saundersi* are simple.

(18.) **Diadasia friesei** n. sp. ♀.—Length 11 mm., black with pale ochraceous pubescence. Head ordinary; facial quadrangle about as broad as long; sides and middle of face, labrum, occiput and cheeks pubescent; clypeus bare and shining, with distinct but sparse punctures, some large and some small; front above antennæ densely punctured, the punctures tending to run into grooves; area just before the ocelli and vertex shining and very sparsely and feebly punctured; flagellum ferruginous beneath; mandibles rufescent in middle; maxillary palpi 6-jointed, third and fourth with long hairs, fourth longer than fifth and sixth together; thorax with short, tolerably abundant ochraceous pubescence; mesothorax shining, with small, not very close punctures; scutellum with distinct sparse punctures; base of metathorax minutely granular; tegulæ reddish testaceous; wings dusky hyaline; nervures brown; second submarginal cell rather small, hardly narrowed above, receiving the recurrent nervure a little beyond its middle; third submarginal much larger than first; legs black, with ochreous pubescence, that on hind tibiæ long and conspicuously plumose; long hairs on inner side of basal joint of hind tarsi becoming a sort of purplish brown; abdomen dullish and hardly or not punctured, with short sparse pubescence, *pale on the first segment, mostly fuscous or black on the others*; hind margins of the first to fourth segments with ochreous hair-bands, well defined and conspicuous, except on the first; apex with dense ochreous pubescence, more or less tinged with fulvous.

Hab.—Southern California, two sent by Mr. Fox. Named after Mr. H. Friese, of Innsbruck. *D. friesei* is allied to *D. rinconis*, but the tegulæ are quite differently colored, the second submarginal cell is conspicuously smaller, and the two abdominal bands are narrow, with their upper outline ill defined. It differs from *D. apacha* by the color of the abdominal pubescence; from *D. toluca* in the mesothorax and the shape of the second submarginal cell; from *D. albovestita* by the pubescence, and from *D. tricineta* by the abdominal pubescence, especially the absence of black hair on the sixth segment.

(19.) **Diadasia megamorpha** n. sp. ♂. Length about 16 mm.; black, with dull white pubescence not hiding the surface. Head somewhat broader than long; facial quadrangle longer than broad; ocelli in a line; face to some distance above the antennæ; labrum, lower and hind part of cheeks with abundant pubescence; vertex and upper part of cheeks bare, shining, with some scattered punctures,—even these wanting on sides of vertex; clypeus punctured; mandibles black, with two orange stripes near the tip; maxillary palpi 6-jointed, fourth longer than fifth and sixth together; antennæ black, reaching to hind part of tegulæ; thorax with abundant erect white pubescence, except the mesothorax, which is bare, shining, with numerous shallow but distinct punctures and a very few scattered hairs; at the place of each parapsidal groove is a

short ridge; base of metathorax smooth and shining, with a median furrow; tegulæ large, reddish brown; wings hyaline; nervures dark brown; second submarginal cell narrowed about one-third above, *first recurrent nervure joining second transverso-cubital*, second joining third submarginal cell almost at its tip; legs well developed, black, the tarsi becoming brownish; pubescence of legs all white, except on inner side of basal joints of tarsi, where it become orange-brown; spurs large, ferruginous; hind tibiæ swollen; abdomen rather elongate, shining, with small sparse punctures; hind margins of segments narrowly brownish; the whole surface with rather long, erect, yellowish white hair, only dense enough to conceal to surface towards and at the apex; no well-defined bands; apex strongly bidentate.

♀. Length about 15 mm., but much broader, and thus more bulky than the ♂. The pubescence is shorter and denser, with more of an ochreous tint, and covers the front and sides of the mesothorax, leaving, however, a shining and sparsely punctured middle area. The wings are slightly brownish, and the first recurrent nervure joins the second submarginal cell just before its end, while the second recurrent meets the third transverso-cubital. Antennæ entirely black, hardly reaching to tegulæ; hind portion of scutellum and postscutellum dullish, with close punctures; abdomen hairy, the pubescence appressed; hind margins of segments 2 to 4 with narrow white hair-bands; apex becoming fulvous; the pubescence of the abdomen, and especially of the legs, is cream color rather than white; brush on inner side of basal joints of tarsi dark, chocolate, with a slight coppery tint. Claw and the large claw-joint entirely black; tegulæ piceous, with a pale brown margin.

Hab.—The ♂ was taken on the campus of the New Mexico Agricultural College, Mesilla Valley, in September (Ckll. 2408). It was compared by Mr. Fox with Cresson's types and returned marked "near *densa*." The ♀ was taken at flowers of *Sphæralcea angustifolia* at Whitewater, by the White Sands, New Mexico, October 6th (Ckll. C 32.). I think it is safe to assume that the sexes described are of one species, which may be known by its large size. Of the New Mexico species *D. megamorpha* is most like *D. australis* Cr., which I took at Santa Fé, June 20th, at flowers of *Opontia*. The ♂ of *australis* will readily be known from our insect by the structure of the hind tarsi, the more pubescent abdomen and the pubescent mesothorax. I find I have also a ♂ of *D. australis*, which I took on July 9th at Whitewater, in Grant Co., New Mexico, a locality far distant from the "Whitewater" cited above for the ♀ of *megamorpha*. In the Mesilla Valley the common *Diadasia* is *D. diminuta*: it visits especially the flowers of *Sphæralcea angustifolia*, but also garden roses. Another species, *D. enavata* Cr. (*ursina*), is common in New Mexico, and may be taken in the Mesilla Valley, in September, at flowers of *Bigelovia wrightii* and *Verbesina encelioides*, at Santa Fé, in August, at flowers of *Argemone*, and has also

occurred at Rincorn, New Mexico, July 5th, at flowers of *Chilopsis* (Ckll. B 4): at Lone Mountain, nearly Silver City, July 6th, in closed flower of *Argemone*; Lone Mountain, July 7th, at flowers of *Sidalcea malvæflora*; Deming, July 9th, at flowers of *Verbesina encelioides*, and at Colora'o, New Mexico, July 10th, at flowers of *Sphæralcea angustifolia*.

(20.) **Calliopsis subalpinus** Ckll., 1894.—One from Arizona, sent by Mr. Fox.

(21.) **Calliopsis semirufus** Ckll., 1896.—Two from Arizona, sent by Mr. Fox.

These bees are hardly true *Calliopsis*; in several respects they more resemble *Panurgus*.

I think *C. semirufus* is the ♀ of *subalpinus*, notwithstanding the difference of color. If so, the case is a most interesting one, since the ♀ has the red abdomen, the ♂ being all black—exactly the reverse of what occurs in certain species of *Perdita*.

(22.) **Calliopsis obscurellus** Cress.

One from Southern California, sent by Mr. Fox; several from Pasco, Washington, May 25th (T. Kincaid). Thus the species appears to occupy the whole Pacific Coast of the United States.

(23.) **Panurginus innuptus** (Ckll.).

Calliopsis innuptus Ckll., Ent. News, 1896, p. 222.—Colorado.

The type was a ♂. I have the ♀ from Colorado Springs, Colo., and also from Nowlin County, South Dakota, one lent by Mr. Fox. The ♀ resembles the ♂, but the face is all dark; it is very much like *C. perlævis*, but is known from it by the ferruginous hind tarsi, the dark flagellum and the quite pellucid wings.

(24.) **Panurginus atriceps** (Cr.).

Calliopsis atriceps Cress., Tr. Am. Ent. Soc., vii, p. 67, ♂.—California.

Mr. T. Kincaid has taken both sexes in numbers at Seattle, Washington, during the first half of May; also at Olmupia, May 28th to June 2nd. One ♂, Seattle, May 14th, was at flowers of *Rubus ursinus*. The ♀ resembles the ♂, but is more robust, with shorter antennæ and a broader abdomen. It is a smooth insect with a dark flagellum like *asteris*, *rudbeckiæ*, *albitarsis*, *ornotipes* and *bidentis*. The tegulæ are black or piceous, conspicuously darker than in any of the above five species. The first recurrent nervure meets the transverso-cubital as in *clypeatus*, but the ♀ *clypeatus* has the flagellum ferruginous beneath.

Mr. Fox sends a ♂, *P. atriceps*, marked Craig's Mt., Idaho. This is interesting, because it adds one to the several known instances of Pacific Coast forms invading that region.

Calliopsis and *Panurginus*.

The following table is intended to facilitate the identification of species of *Calliopsis* in the broad Cressonian sense, exclusive of the females of *Panurginus*, which are so much alike that I cannot construct a table until I have all of the species before me:

Abdomen fulvous or rufous.....	2.
Abdomen dark, with or without markings.....	3.
2. Wings hyaline, a dark spot at apex.....	semirufus Ckll.
Wings uniformly pale fuscous.....	abdominalis Cr., ♂, ♀.
3. Face with light markings.....	4.
Face without light markings.....	43.
4. Abdomen with color-bands or spots.....	5.
Abdomen without bands or spots.....	14.
5. First segment of abdomen red marked with black, face-marks yellow, dog-ear marks present.....	tricolor Ckll.
Not so.....	6.
6. Clypeus dark, but white lateral spots.....	obscurus Cr., ♀.
Clypeus only partly light, females.....	7.
Clypeus all light, except the dots and edge, males.....	10.
7. Pale marks yellow or yellowish, continuous yellow bands on abdomen.....	zebratus Cr.
Pale marks white or whitish.....	8.
8. Supraclypeal mark present, smaller.....	8a.
8a. Lateral face-marks broader, clypeus with a median white stripe.....	australior Ckll.
Lateral face-marks narrow, clypeus without a median stripe.....	scitulus Cr.
8b. Supraclypeal mark absent, larger.....	9.
9. Abdomen with two interrupted bands.....	edwardsii Cr.
Abdomen with only spots.....	edwardsii v. lateralis Cr.
10. Supraclypeal mark present.....	11.
Supraclypeal mark absent, clypeus white.....	13.
11. Clypeus, etc., yellow, tubercles yellow.....	zonalis Cr., ♂.
Clypeus, etc., white or yellowish white.....	12.
12. Larger, California species.....	edwardsii Cr., ♂.
Smaller, Colorado species, posterior tarsi with basal joint long, flat, dilated, truncate at tip.....	pictipes Cr., ♂.
13. "Lower sides of face" white; "spot at extreme base and apex of intermediate tibiae yellowish".....	cinctus Cr., ♂.
"Sides of face" white; 4 anterior tibiae and tarsi more or less yellowish in front.....	obscurus Cr., ♂.
14. Females.....	15.
Males.....	17.

15. Clypeus with a longitudinal mark or band on disc.....16.
 Clypeus yellow, except two cuneiform black marks, lateral face-marks going nearly to summit of eyes**coloradensis** Cr., ♀.
 Sides of clypeus yellow, small dog-ear marks, margins of abdominal segments testaceous.....**maculatus** Sm., ♀.
 Face with only a kidney-shaped yellow mark, partly (sometimes not at all), on clypeus; legs all dark; marginal cell squarely truncate.
Panurginus renimaculatus (Ckll.), ♀.
16. Clypeal mark white. Georgia species.....**lapidus** Cr., ♀.
 Clypeal mark yellow, lateral and supraclypeal marks present
andreniformis Sm., ♀. and sulsp. **rhodophilus** Ckll., ♀.
17. Black spot at tip of wing, face very broad, supraclypeal and dog-ear marks present, lateral marks very small.....**subalpinus** Ckll.
 Legs entirely, and all face below antennæ, bright yellow.
flavipes-andreniformis Sm., ♂.
 Not so, legs not all yellow.....18.
18. Pale color of face confined to clypeus19.
 Pale color of face not confined to clypeus.....22.
19. Clypeus not at all light, sometimes only a spot of yellow. California species.....**Panurginus californicus** (Cr.), ♂.
 Clypeus all light.....20.
20. First recurrent nervure meeting the transverso-cubital; clypeus white.
Panurginus clypeatus (Cr.), ♂.
 First recurrent nervure not meeting the transverso-cubital.....21.
21. Larger, marginal cell longer.....**Panurginus townsendi** (Ckll.).
 Smaller, marginal cell shorter.....**Panurginus bakeri** (Ckll.).
22. Pale color confined to clypeus and lateral marks.....23.
 Pale color not confined to clypeus and lateral marks.....32.
23. Wings wholly dark fuliginous.....**fraterculus** Ckll.
 Wings not nearly so dark.....24.
24. Face-marks white25.
 Face-marks yellow.....26.
25. Face hairy.....**hirsutifrons** Ckll.
 Face not hairy.....**Panurginus pauper** (Cr.).
 (Similar, but face-marks very pale yellow, lateral marks obtuse, face not nearly so hairy as in *hirsutifrons*.....**albitarsis** Cr.).
26. Tubercles dark27.
 Tubercles light30.
27. Basal joints of tarsi all yellow.....28.
 Basal joints of anterior and middle tarsi testaceous.
Panurginus parvus (Rob.).
 Tarsi brownish testaceous.....29.
28. Length 7 mm.....**Panurginus rugosus** (Rob.).
 Length 5 to 6 mm.....**Panurginus asteris** (Rob.), var.
 Tibiæ and tarsi bright yellow**C. coloradensis** Cr., ♂.
29. Larger, face-marks deep yellow, stigma dark ferruginous brown.
Panurginus innuptus Ckll.
 Smaller, face-marks very pale yellowish, stigma dark fuscous.
Panurginus albitarsis (Cr.).
 Face-marks lemon-yellow, tegulæ brown (very pale and hyaline in *innuptus*), wings faintly dusky at apex (not at all in *innuptus*).
picipes Cr.

30. Head and thorax quite thickly pubescent, all the tarsi pale yellow. Illinois species.....**illinoensis** Cr.
Head and thorax sparsely pubescent31.
31. Lateral face-marks very narrow above. **Panurginus bidentis** (Ckll.).
Lateral face-marks not very narrow above.
Panurginus rudbeckiæ (Rob.), if there is a var. without
supraclypeal mark.
Lateral face-mark only "a spot".....**Panurginus asteris** (Rob.).
Obs. *P. rudbeckiæ* also differs from *asteris* by the median impunctate depression of clypeus. Perhaps a form of *coloradensis* comes here; it will have tibiæ and tarsi bright yellow.
32. Supraclypeal marks, but no dog-ear marks.....33.
Dog-ear marks present, or face even all yellow.....39.
33. Tibiæ and tarsi all yellow.....**nitipes** Ashm
Tibiæ, at least, mostly dark.....34.
34. Four hind tibiæ yellow at base and apex35.
Four hind tibiæ not yellow at base and apex.....36.
35. Lateral face-marks prolonged above level of supraclypeal mark.
concinuus Fox.
Lateral face-mark "a spot".....**P. asteris** (Rob.).
(In *rudbeckiæ* the lateral face-marks are longer than in *asteris*, and there is an impunctate area on clypeus; the flagellum is pale testaceous beneath in *concinuus*, dark in *rudbeckiæ*).
36. Clypeus, etc., white, antennæ wholly black.....**atricornis** Cr.
Clypeus, etc., yellow37.
37. Clypeus with a median impunctate space.....**P. rudbeckiæ** (Rob.).
Clypeus without such space.....**Panurginus labrosus** (Rob.).
38. Wings dark fuliginous, face lemon-yellow, not quite up to antennæ.
aethiops Cr.
Wings not dark fuliginous.....40.
39. Scape wholly black41.
Scape yellow in front42.
40. Less densely punctured, marginal cell longer.
Panurginus (*ornatipes* var.?) **boylei** (Ckll.).
More densely punctured, marginal cell shorter.
Panurginus compositarum (Rob.).
41. First four tibiæ yellow in front.....42a.
Tibiæ yellow with a black spot on each side.
Panurginus ornatipes (Cr.).
- 41a. All the tibiæ yellow in front.....**C. rhodophilus** Ckll.
First four tibiæ yellow in front.....**C. flavifrons** Sm.
42. Abdomen with light color bands.....44.
Abdomen without such bands.....45.
43. Abdominal bands white, anal fimbria dirty white **meliloti** Ckll., ♀.
Abdominal bands yellow, anal fimbria fuscous.....**cinctus** Cr., ♀.
Abdominal bands and anal fimbria white, *scitulus*-like species, much larger than *meliloti*.....**personatus** Ckll., ♀.
44. Males.....46.
Females.....47.

45. Larger, abdominal segments depressed at base. Mexican.

Panurginus mexicanus (Cr.).

Smaller, shining. Californian.....**Panurginus atriceps** (Cr.).

46. Wings dark fuliginous.....48.

Wings not dark fuliginous.....**Panurginus** spp.

47. Larger, no shining boss at top of eyes.....**æthiops** Cr.

Smaller, a shining boss at top of eyes.....**fraterculus** Ckll.

It must be admitted that in several of its parts the above table is unsatisfactory, but I have had it in use for some time and found it serviceable. The student must remember that these tables are intended to suggest identities rather than prove them, and the detailed descriptions should always be consulted. This is especially to be insisted on in a fauna like our own, containing so many still undescribed species.

25.) **Heriades semirubra** n. sp. ♂.—Length about 8 mm., black, the first three abdominal segments and the extreme sides of the fourth ferruginous. Pubescence white, mostly with a greyish tinge, very abundant on face, hiding the surface; head round seen from in front; facial quadrangle much longer than broad, the orbits parallel; ocelli in a triangle; cheeks with long dense hair beneath; mandibles hairy at base; apical half dark ferruginous; vertex very closely punctured; antennæ ordinary; flagellum dark ferruginous beneath; thorax strongly and closely punctured; punctures of scutellum somewhat larger than those mesothorax; base of metathorax smooth and shining; tegulæ shining, amber color; wings clear; nervures and stigma piceous; stigma very small, first recurrent nervure reaching second submarginal cell at a point distant from the origin of the first transverso-cubital not more than half the length of the latter; legs black, the tarsi becoming a little brownish at end; abdomen well punctured; hind margins of segments pelucid whitish, third segment with a suffused dorsal black patch; lateral hind margins of the segments with white hair, towards the apex there are more or less continuous, but thin and inconspicuous, bands; apex broadly truncate, with a rounded central emargination, this truncate portion is ferruginous; penultimate segment with a small tooth on each extreme side; ventral segments with white apical hair-bands; no subbasal ventral tooth or process.

Hab.—Southern California, two sent by Mr. Fox. This is by no means a typical *Heriades*, yet it is not an *Ashmeadiella*. The resemblance between *H. semirubra* and *Ashmeadiella holtii* Ckll., ined., is remarkably close, but the latter is smaller, has the end of the abdomen and the hind legs wholly red, besides presenting the characteristic abdominal structure of its genus. The mouth-parts are retracted in the specimens of *H. semirubra* described.